

WHAT IS CLAIMED IS:

54711 1. An external infusion device for infusion of a liquid into a body, the external infusion device comprising:

a housing;

5 a receiver coupled to the housing for receiving remotely generated commands;

a processor coupled to the housing and the receiver to receive remotely generated commands and to control the external infusion device in accordance with the commands; and

an indication device to indicate when a command has been received and indicate when the command is being utilized to control the external infusion device such that the external

10 infusion device is capable of being concealed from view when being remotely commanded.

✓ 2. An external infusion device according to claim 1, wherein the external infusion device includes a memory for storing programs, and wherein the receiver is capable of receiving software updates and facilitating remote programming of external infusion device capabilities.

✓ 3. An external infusion device according to claim 1, wherein the external infusion device includes a memory for storing a patient infusion history and pump activity.

4. An external infusion device according to claim 1, wherein the remotely generated commands are capable of programming and activating an audio bolus delivery of the liquid by the external infusion device.

5. An external infusion device according to claim 1, wherein the remotely generated commands are capable of programming and activating a vibration bolus delivery of the liquid by the external infusion device.

✓ 6. An external infusion device according to claim 1, wherein the remotely generated commands are capable of programming and activating a temporary basal rate delivery of the liquid by the external infusion device.

5 7. An external infusion device according to claim 1, wherein the remotely generated commands are capable of programming and suspending delivery of the liquid by the external infusion device.

8. An external infusion device according to claim 1, wherein the remotely generated commands are capable of programming and activating an extended bolus delivery of the liquid by the external infusion device.

9. An external infusion device according to claim 1, wherein the remotely generated commands are capable of programming and activating a dual wave bolus delivery of the liquid by the external infusion device.

10. An external infusion device according to claim 1, wherein the remotely generated commands are capable of programming and activating a profiled bolus delivery of the liquid by the external infusion device.

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11. An infusion system for infusing a liquid into a body, the infusion system comprising:

an external infusion device including:

a housing;

5 a receiver coupled to the housing and for receiving remotely generated commands;

a processor coupled to the housing and the receiver to receive remotely generated commands and to control the external infusion device in accordance with the commands; and

10 an indication device to indicate when a command has been received and indicate when the command is being utilized to control the external infusion device such that the external infusion device is capable of being concealed when being remotely commanded; and

a remote commander including:

15 a commander housing;

a keypad coupled to the commander housing for inputting commands; and

a transmitter coupled to the keypad for transmitting commands to the receiver of the external infusion device.

20 12. An infusion system according to claim 11, wherein the external infusion device further includes a device transmitter to verify receipt of commands from the remote commander, wherein the remote commander further includes a remote receiver to receive the verification from the device transmitter of the external infusion device, and wherein the remote commander further includes a remote indication device to indicate receipt of the verification from the  
25 external infusion device.

13. An infusion system according to claim 11, wherein the remote commander is

sized to fit on a key ring.

14. An infusion system according to claim 11, wherein the remote commander uses RF frequencies to transmit remote commands to the external infusion device.

15. An infusion system according to claim 11, wherein the remote commander uses IR frequencies to transmit remote commands to the external infusion device.

16. An infusion system according to claim 11, wherein the remote commander uses optical frequencies to transmit remote commands to the external infusion device.

17. An infusion system according to claim 11, wherein the remote commander uses ultrasonic frequencies to transmit remote commands to the external infusion device.

18. An infusion system according to claim 11, wherein the remote commander uses audio frequencies to transmit remote commands to the external infusion device.

19. An infusion system according to claim 11, wherein the remote commander uses magnetic effects to transmit remote commands to the external infusion device.

20. An infusion system according to claim 11, wherein the remote commander is capable of providing remote commands at a distance greater than 1 inch.

21. An infusion system according to claim 11, wherein the processor of the external infusion device has a unique identification code, and wherein the remote commander includes the capability to read and learn the unique identification code of the external infusion device, and wherein the remote commander and the external infusion device use the unique identification

code to substantially avoid interference with other external infusion devices.

22. An infusion system according to claim 11, wherein the remote commander has a unique identification code, and wherein the processor of the external infusion device includes the capability to read and learn the unique identification code of the remote commander, and wherein the remote commander and the external infusion device use the unique identification code to substantially avoid interference with other remote commanders.

23. An infusion system according to claim 11, wherein the remote commander includes a mode that permits physician controlled programming of specific capabilities of the external infusion device to the exclusion of the user.

24. An infusion system according to claim 11, wherein the remote commander may also include a link to a computer to allow computer programming to initiate or alter available capabilities of the external infusion device.

25. An infusion system according to claim 11, wherein the external infusion device includes a memory for storing programs, and wherein the receiver is capable of receiving software updates to facilitate remote programming of external infusion device capabilities.

26. An infusion system according to claim 11, wherein the remote commander is capable of receiving data from another medical device and relaying the received data to the external infusion device.

27. An infusion system according to claim 26, wherein the remote commander is capable of remotely commanding and controlling the other medical device.

29. An infusion system according to claim 11, wherein the remote commander is capable of programming and activating a vibration bolus ~~delivery~~ of the liquid by the external infusion device.

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35. An external infusion device for infusion of a liquid into a body, the external infusion device comprising:

a housing;

a processor coupled to the housing;

5 a bolus estimator used in conjunction with the processor and externally supplied values to estimate an amount of liquid to be infused based upon an estimate of a material to be taken in by the body; and

an indication device to indicate when an amount of fluid to be infused has been calculated.

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36 An external infusion device according to claim 35, wherein the bolus estimator includes the capability to calculate a correction bolus based upon a current characteristic value and a target characteristic value.

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37. An external infusion device according to claim 36, wherein the bolus estimator includes a liquid sensitivity that is used to determine the amount of liquid to be infused to calculate the correction bolus.

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20 38. An external infusion device according to claim 37, wherein the liquid to be infused is insulin, and where the material to be taken in are carbohydrates.

39. An external infusion device according to claim 35, wherein the liquid to be infused is insulin, and where the material to be taken in are carbohydrates.

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40. An external infusion device according to claim 35, wherein the bolus estimator includes a lockout to prevent the calculation of a bolus for a predetermined period of time after a bolus estimated by the bolus estimator.

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41. An external infusion device according to claim 35, wherein the supplied values are codes representing a carbohydrate value of specific foods.

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42. An external infusion device according to claim 35, wherein the supplied values are codes representing a carbohydrate value of specific meals.

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43. An external infusion device according to claim 35, further including a duration factor to determine a value of how long a previously infused amount of liquid will remain active in the body, wherein the determined value is used to adjust the amount of the fluid to be infused.

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44. An external infusion device for infusion of a liquid into a body, the external infusion device comprising:  
a housing containing a reservoir;  
15 a processor coupled to the housing; and  
a vibration alarm used in conjunction with the processor to provide an alarm, and to generate sufficient vibration to assist in removing gas bubbles from the fluid in the reservoir during priming of the external infusion device.

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45. An external infusion device according to claim 44, wherein the vibration alarm is used to agitate the fluid in the reservoir in between successive delivery periods of the fluid by the external infusion device.

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46. An external infusion device according to claim 44, wherein the vibration alarm is used to agitate the fluid in the reservoir during delivery of the fluid by the external infusion device.



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47. An external infusion device for infusion of a liquid into a body, the external infusion device comprising:  
a housing containing a reservoir;  
a processor coupled to the housing;  
5 an audible alarm coupled to the processor; and  
a vibration alarm used in conjunction with the processor and the audible alarm to provide an alarm.

48. An external infusion device according to claim 47, wherein the vibration alarm is also used to agitate the fluid in the reservoir in between successive delivery periods of the fluid by the external infusion device.

49. An external infusion device according to claim 47, wherein the vibration alarm is also used to agitate the fluid in the reservoir during delivery of the fluid by the external infusion device.

50. An external infusion device according to claim 47, wherein the processor selects to activate one of the audible alarm and vibration alarm independently of the unselected alarm.

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51. An external infusion device for infusion of a liquid into a body, the external infusion device comprising:  
a housing;  
a processor coupled to the housing;  
a keypad coupled to the housing and used in conjunction with the processor to determine  
25 an estimate of remaining battery power; and  
an indication device to indicate the estimate of remaining battery power.

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52 An external infusion device for infusion of a liquid into a body, the external  
infusion device comprising:  
a housing;  
a processor coupled to the housing;  
5 a memory coupled to and used in conjunction with the processor to store at least two  
personal delivery patterns;  
a keypad coupled to the housing and used in conjunction with the processor to select one  
of the at least two personal delivery patterns; and  
an indication device to indicate the selected personal delivery pattern,  
10 wherein the processor controls the external infusion device in accordance with the  
selected one of the at least two personal delivery patterns.

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a housing;

a processor coupled to the housing;

an indication device to indicate the selected personal delivery pattern and when a command has been received to control the external infusion device in accordance with the selected personal delivery pattern such that the external infusion device is capable of being concealed from view when being remotely commanded,

wherein the processor controls the external infusion device in accordance with the selected one of the at least two personal delivery patterns.

54. An external infusion device for infusion of a liquid into a body, the external infusion device comprising:

- a housing;
- a processor coupled to the housing;
- 5 a memory coupled to and used in conjunction with the processor to store at least two basal rate profiles;
- a keypad coupled to the housing and used in conjunction with the processor to program the at least two basal rate profiles; and
- an indication device to indicate the basal rate profiles during programming,
- 10 wherein the processor controls the external infusion device in accordance with the programmed at least two basal rate profiles.

55. An external infusion device for infusion of a liquid into a body, the external infusion device comprising:

- 15 a housing;
- a processor coupled to the housing;
- a memory coupled to and used in conjunction with the processor to store at least two bolus types;
- a keypad coupled to the housing and used in conjunction with the processor to select one
- 20 of the at least two bolus types; and
- an indication device to indicate the selected bolus type,
- wherein the processor controls the external infusion device in accordance with the selected one of the at least two bolus types.